

REMARKS

In the foregoing amendments, claims 10, 12, and 15 were amended to correct topographical errors. These claims were also amended by changing the transitional phrase to "consisting essentially of," which will be discussed below. Claim 11 was canceled, and claim the 16 was added to the application. Claims 1-9 were previously canceled. Accordingly, claims 10 and 12-16 are in the application for consideration by the examiner.

The Official action requested that Fig. 4B be labeled as "PRIOR ART."

Together with this response, applicant is filing a Request for Approval Drawing Changes, where Fig. 4B is labeled as "PRIOR ART." Accordingly, applicant respectfully requests that this portion of the objection to the drawings be reconsidered and withdrawn.

The Official action also objected to the drawings under 37 CFR §1.83(a). The Official action stated that the drawings must show every feature of the invention specified in the claims. The Official action continued that the specifically claimed stem integrally formed with the disk must be shown or the feature canceled from the claims. Applicant respectfully submits figure 4A, as originally filed, illustrates the limitation in the claims that the disk and stem of the rotating disk are integrally formed. In this connection, it is respectfully noted that applicant's specification, when referring to the disk, generally discusses the disk and stem together as a "rotating disk." However, figure 4A, which is a cross sectional view of the rotating disk, clearly shows that the

rotating disk has an upper disk (or disk portion) and a lower stem (or stem portion) that are integrally formed together. For these reasons, applicant respectfully submits that the present drawings illustrate the integrally formed disk and stem of the rotating disk, as presently claimed. Therefore, applicant respectfully requests that the examiner reconsider and withdraw this objection.

An explanation of the support in figure 4A for the limitations set forth in the present claims is set forth below. The following discussion is pertinent to the drawings illustrating the claimed invention, which was discussed above.

The Official action set forth a rejection of claims 10-15 under 35 U.S.C. § 112, first paragraph, because the specification does not reasonable provide enablement for a disk including an integral stem structure or disk of uniform structure, because neither of these limitations were present in the specification as originally filed.

Initially, applicant respectfully submits that it is not necessary for the present specification to exactly set forth (*ipsis verbis*) the expression "an integral stem structure or disk of uniform structure" in order for the specification to support such an expression in the claims. As explained by the court in *Fujikawa v. Wattanasin*, 93 F.3d 1559, 39 USPQ2d 1895 (Fed. Cir. 1996) "[*ipsis verbis*] disclosure is not necessary to satisfy the written description requirement of section 112. Instead, the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question." Therefore, it is not necessary for applicant's

disclosure to include the words "integral structure" or "uniform structure" in order for applicant's specification to provide a written description of, or enablement for, the presently claimed invention.

In this connection, it is respectfully noted that the drawings alone may be sufficient to provide the written description of the invention or enablement of the invention required by §112, first paragraph. *Vas-Cath Inc. v. Mahurkar*, 19 USPQ2d 1111 (Fed. Cir 1991). See also *KangaROOS U.S.A., Inc. v. Caldor, Inc.*, 228 USPQ 32 (Fed. Cir. 1985) and *In re Berkman*, 209 USPQ 45 (CCPA 1981).

Applicant respectfully submits that the claimed "integral structure" of the disk and stem of the rotating disk, as well as the "uniform structure" of the disk and stem of the rotating disk, are shown in and enabled by Fig. 4A. Webster's Collegiate Dictionary (2000) defines the word "integral" as "formed as a unit with another part 'a seat with integral headrest.'" Fig. 4A of the present application shows that the disk or disk portion of the rotating disk and the stem or stem portion of the rotating disk are formed together as a single part and thus are "integral" or an "integral structure." Webster's Collegiate Dictionary (2000) defines the word "uniform" as "having always the same form, manner, or degree ... presenting an unvaried appearance of surface, pattern, or color 'uniform red brick houses.'" Fig. 4A of the present application shows that the disk or disk portion of the rotating disk and the stem or stem portion of the rotating disk are formed a single material always have in the same form

manner or degree and/or present an unvaried appearance of surface, pattern, or color and thus are "uniform" or a "uniform structure."

For the foregoing reasons, applicant respectfully submits that the present specification disclosure provides enablement and a written description for the claims now pending in the application within the meaning of 35 U.S.C. § 112, first paragraph. Therefore, applicant respectfully requests that the examiner reconsider and withdraw this rejection.

Claims 10-14 were rejected under 35 U.S.C. § 102(b) as being anticipated by the article by Satoh *et al.*, titled "Application of Plasma Sprayed Ceramic Coatings to the Base Materials of the Rotating Disk in the Centrifugal Atomization Process" (Satoh). Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Satoh in view of U.S. patent No. 5,814,573 of Hogg.

It is respectfully noted that Satoh was cited to the examiner in an information disclosure statement submitted by the applicant. The teachings of Satoh do not propose a rotating disk having a disk and stem with an integral and uniform structure, such as shown in Fig. 4A of the present application, namely, a structure where the stem and disk are integrally formed and made of the same material, as presently claimed.

It appears that the Official action referred to figure 1 and table 1 of Satoh as showing that both the disk and stem can be made of the same material. However, Fig. 1 of Satoh is only a rough sketch, and cannot be understood by any person skilled the art as showing a rotating disk having a disk and stem

made of an integral and/or uniform structure. Figs. 3 and 4 of Satoh more precisely illustrates the rotating disk corresponding to figure 1 and table 1 of Satoh. As shown Figs. 3 and 4 of Satoh, these teachings only show disk or plate structures without the stem. The teachings of Satoh necessarily propose use of a stem that is made separately from the disk and/or use of a stem made from a material different than that of the disk, in contrast to applicant's claims. In other words, there is no description in Satoh concerning a rotating disk having a uniform integral structure of the disk and stem, as presently claimed. Therefore, applicant respectfully submits that the teachings of Satoh cannot contemplate suggest the invention as set forth in the present claims.

It would appear that Satoh's structure may be similar to what is described in Fig. 8B of Ueda *et al.* (USP # 4,374,074). That is, a disk is fitted in a holder. The structure proposed by Ueda *et al.* was discussed and distinguished from applicant's claimed invention in the voluntary amendment filed on July 24, 2003.

The uniform integral disk and stem structure of applicant's claims has many advantages over the rotating disk structure proposed by the teachings of Satoh. These include the following:

- (1) The presently claimed invention permits very high speed rotation of the rotation disk, and it enables the fabrication of small size powders effectively. This is achieved in the present claims by the integral and uniform structure of the disk and stem, which can be made of a light

material such as silicon nitride. In Satoh, Fe-base powders (size is about 850 μm) are fabricated at a rotating speed of 18,000 rpm. On the other hand, the rotating disk of the presently claimed invention can fabricate micro powders having size of about 30 μm for thermoelectric modules using a rotating speed of 60,000 rpm.

- (2) The presently claimed invention can withstand high speed rotation at 60,000 rpm, because it is light and it has high strength. The structure proposed by Satoh is similar to examples 7-10 in Fig. 5 of the present application. Such structures have high strength, but are heavy. Accordingly, it is difficult for them to rotate at high speed of 60,000 rpm.
- (3) The presently claimed invention includes a rotating disk having a disk and stem made with a uniform integral structure, such as shown in Fig. 4A, that can be made with silicon nitride. This structure provides a lightweight device that can withstand thermal shock (thermal stress). A reason for this is that the material has both low thermal expansion coefficient and high strength.
- (4) The presently claimed invention does not react with molten metal, thereby preventing solidification of a molten material on a rotating disk.

The Official action stated that the "comprising" language in applicant's claims allows for additional unnamed components to be present in the

apparatus, including the spray coating disclosed by Satoh. As mentioned above, claims 10, 12, and 15 were amended to include the transitional phrase "consisting essentially of." The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). "A 'consisting essentially of' claim occupies a middle ground between closed claims that are written in a 'consisting of' format and fully open claims that are drafted in a 'comprising' format." *PPG Industries v. Guardian Industries*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also *Atlas Powder v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988); See also *In re Janakirama-Rao*, 317 F.2d 951, 954, 137 USPQ 893, 895-96 (CCPA 1963).

Applicant respectfully submits that the transitional phrase "consisting essentially of" in claims 10, 12, and 15 distinguishes the invention set forth in these claims from the teachings of Satoh with the meaning of 35 U.S.C. § 102 or 35 U.S.C. § 103. In particular, applicant respectfully submits that the teachings of Satoh require additional materials and structures that materially affects the basic and novel characteristic of the invention set forth in claims 10, 12, and 15. For example, the teachings of Satoh include an undercoat of Ni-

Cr and a spray coating additional materials. This undercoat and spray coating are necessary in the rotating disk proposed by Satoh. However, these additional materials and structures will have a material effect on the basic and novel characteristics of applicant's claimed invention by increasing the weight of the rotating disk, reducing its resistance to thermal shock (thermal stress), a reducing its rotation speed, etc. Since the additional materials required in the teachings of Satoh are excluded from applicant's claims by the transitional expression "consisting essentially of," the presently claimed invention is patently distinguishable from the teachings of Satoh.

The teachings of Hogg were used in the rejection of claim 15. However, these teachings do not cure or rectify the deficiencies in the teachings of Satoh, which were discussed at length above.

For the foregoing reasons, applicant respectfully submits that the invention set forth in claims 10 and 12-16 is patently distinguishable from the teachings of the Satoh alone or together with Hogg within meaning of 35 U.S.C. § 102 or 35 U.S.C. § 103. Therefore, applicant respectfully requests that the examiner reconsider and withdraw these rejections.

In view of the foregoing amendments and remarks, favorable consideration and a formal allowance of claims 10 and 12-16 are respectfully requested. While it is believed that the present response places the application in condition for allowance, should the examiner have any comments or

questions, it is respectfully requested that the undersigned be telephoned at the below listed number to resolved any outstanding issues.

In the event this paper is not timely filed, applicant hereby petitions for an appropriate extension of time. The fee therefor, as well as any other fees which may become due, may be charged to our deposit account No. 22-0256.

Respectfully submitted,
VARNDELL & VARNDELL, PLLC

A handwritten signature in black ink, appearing to read "R. Eugene Varndell, Jr.", is written over a horizontal line.

R. Eugene Varndell, Jr.
Attorney for Applicant
Registration No. 29,728

Atty. Case No. VX012340
106-A S. Columbus Street
Alexandria, Virginia 22314
(703) 683-9730

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